ENERGY SOLUTIONS

ES PRODUCT RANGE AND SERVICES

ES TouchControl

Panel Building

ESP Panel System

System in a Box

ES DockPower

ES LightNet

ES LoadBank

ES Hull Isolation Transformers

ES Tank Mapping Interface

ES Tank Senders

3D Design & Technical Drawing Service

ES Automated Loom System

DISTRIBUTED PRODUCTS

Victron Inverters, Chargers & Multi's

Victron Batteries

Northern Lights Generators

Lugger Engines

Aqualuma Underwater Lighting & Camera

Somy Boilers & Calorifiers

Ratio Electric Shore Power Systems & Cord Sets

ASEA Frequency Converters

Rolls Batteries

Sonnenschein Batteries

CruzPro Instruments

PMS Modular Panel System

POWER AT YOUR CONTROL

Catalogue / April 2010

AQUALUMA UNDERWATER LIGHTING · ASEA Power Systems · Ratio ELECTRIC · Sonnenschein · Rolls · victron energy · NORTHERN LIGHTS

ENERGY SOLUTIONS

COMPANY PROFILE

Profile

Energy Solutions has grown over 14 years into a comprehensive electrical power and panel building manufacturing and distribution business.

The core activities of the company involve the innovative design and manufacture of sophisticated monitoring and control panels for marine, commercial and vehicle industries. Alongside this, the business is in a unique position of developing and manufacturing it's own range of products for a variety of electrical power requirements from ES LoadBanks to ESP Panels to ES LightNet.

Distribution of key, complementary products from leading worldwide manufacturers is an important part of our systems approach.

We are the No 1 UK distributor for Victron Energy and the sole UK agent for Northern Lights generators.

By being able to supply a full range of power and monitoring products we are able to work with customers on creating unique and effective systems. To stay ahead we continually look forward in the market, reviewing and developing products which address our clients' needs and meet the increasingly sophisticated demands of end users. This approach has won us business from a wide range of worldwide customers including private clients, OEM boat builders, specialist vehicle suppliers and super yacht projects.

Design & manufacture

- Marine Helm Panels
- Bespoke Panels
- TouchScreen Control Panels
- Glass Bridge Solutions
- DockPower Isolation Transformers
- ESP Panels
- ES LoadBank

Suppliers of

- Marine Generators
- Marine Engines
- Industrial Generators
- Batteries
- Inverters
- Chargers
- Frequency Converters
- Marine Underwater Lights
- Heating Systems
- Tank Senders
- Alternators

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SYSTEMS

System Solutions - Marine, Vehicle, Off Grid & Industrial

At Energy Solutions we supply the full range of products needed to build fully integrated power, monitoring and control systems in marine, vehicle, off grid and industrial applications.

These systems are complemented with additional products that offer functionality and enhanced sophistication for the most discerning producer and end users.

We supply high quality products from leading manufacturers that compliment and integrate with each other. We also design and manufacture key products to ensure that systems are complete, robust and efficient.

From basic systems, using the core products in our range, to highly sophisticated systems requiring bespoke equipment, we offer customers technical advice and specification; design, installation and service.

Marine Systems

From narrowboats to superyachts, boatbuilders and owners are now demanding increasingly sophisticated power, control and monitoring systems to cope with the equipment they have on board and to enhance their on-board experience.

Vehicle Systems

With professional and recreational vehicles using an increasing amount of tools, equipment and electrical devices there is a growing demand from automotive builders for full power systems that offer reliable yet sophisticated capabilities.

Off Grid Systems

Homes & businesses across the UK and Europe are now looking at the potential benefits of supplying some, if not all, of their power requirements from off-grid sources.

Industrial Systems

Mobile units, emergency back-up, cost-effective start up - there are many requirements from industry for power and control products that aid their main power supply or work effectively in mobile or remote locations.

POWER AT YOUR CONTROL

ES TOUCHCONTROL

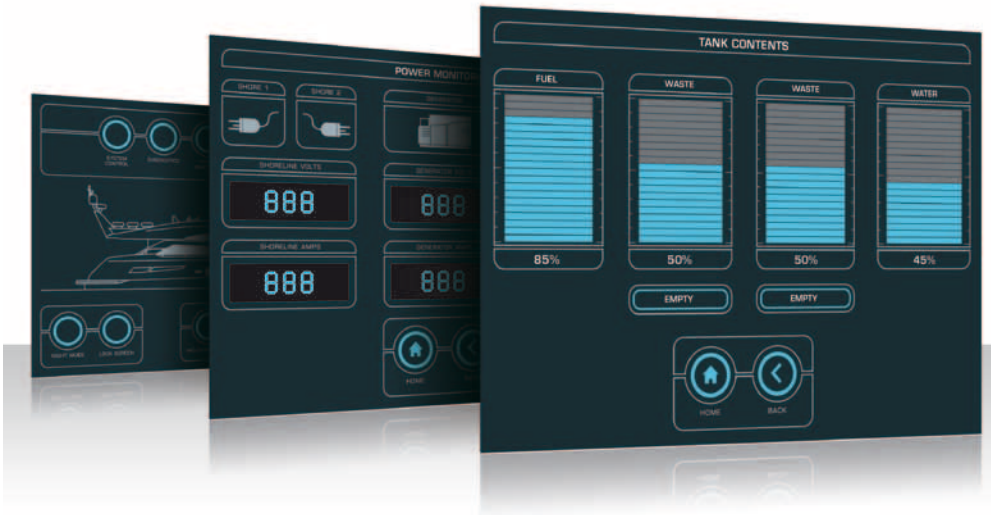
Next generation monitoring and control. Bringing panels to life.

Working with key manufacturers of monitor and control systems Energy Solutions have designed systems for boat builders of all sizes.

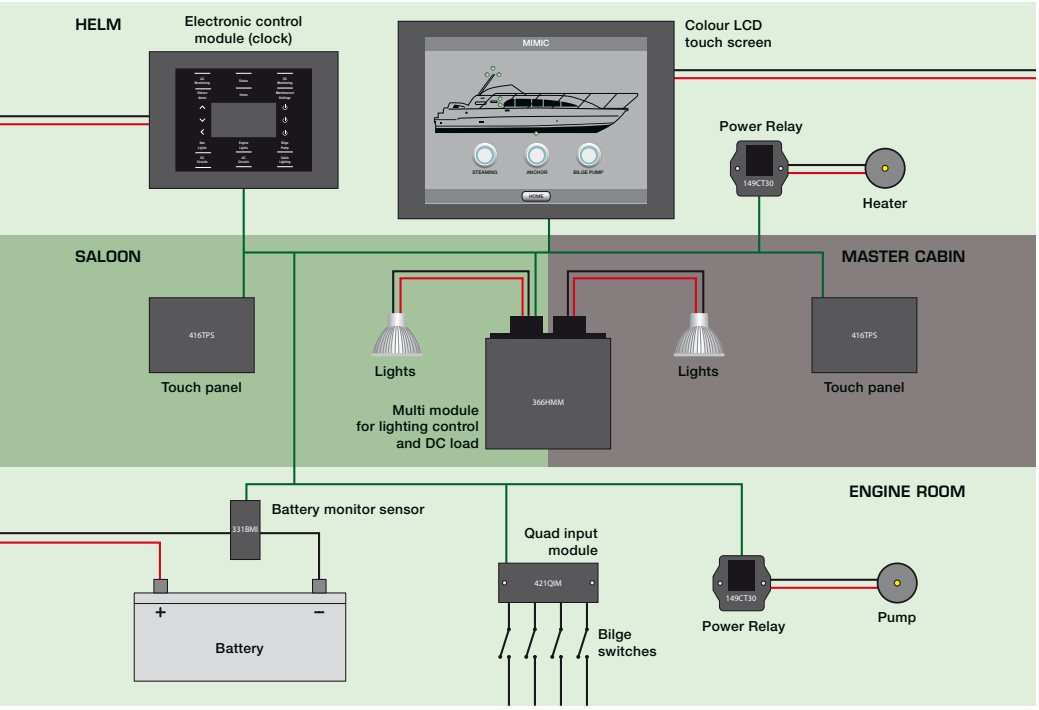
From mega-yachts to cruisers and work vessels, Energy Solutions have the technology and skills to develop a system with touch screen interface that addresses your needs, your customers wishes, and helps reduce build time and costs.

With integrated systems that allow owners to operate all of their electrical systems from screens or from one panel; up to fully integrated system that allows control and monitoring of all data and equipment such as engines, generators, pumps, navigation etc.

We work with each client to design and build bespoke applications to ensure each project has a unique look.



LCD touch screen panel within multiplexing system - simple overview



ES TouchControl

- All controls from one interface
- Contemporary, innovative look
- Bringing technology onboard
- User friendly.

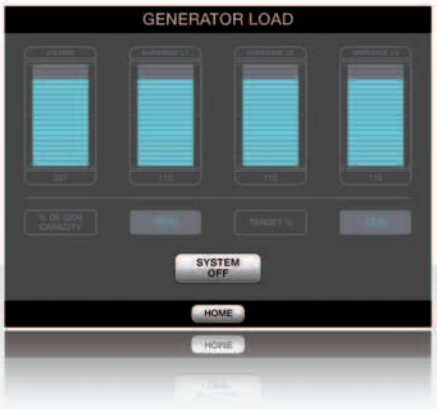
Advantages for boat builders:

- Reduced build costs and installation times
- Appeals to the 'iPod' generation
- Provides competitive edge
- Create your own branded look and feel
- Simple to cope with non standard options - no new wires to pull

Energy Solutions offer a full consultation and design service for ES TouchControl panels and systems.

- Consultation on requirements
- Range of technology solutions
- Development and design all done in-house
- Innovation – constantly updating
- Sleek, contemporary designs

We now design and supply ES TouchControl panels for vehicle, off grid and Industrial markets. Please ask for further details.



Full product listings, product technical information, general technical information and price lists online at **www.energy-solutions.co.uk**

PANEL BUILDING

Research, design and manufacturing of bespoke panels

Energy Solutions offer a range of electrical design & build services to the yacht industry. Our bespoke panel building capabilities allow us to build to your exact requirements.

Research and Design Service

Based at our Head Office in Rochester, Kent we have a fully skilled research, design and manufacturing unit specialising in bespoke panel building. Working closely with our clients we will carry out the entire electrical design including load analysis for your project. This will generate a detailed set of drawings, bills of materials, cable schedules and any custom system design that may be required.

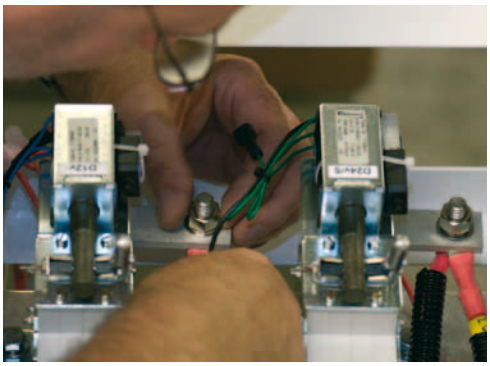
Our experienced team are used to working with leading production boat builders as well as on superyacht projects. They not only work to client specification but also develop unique and innovative electrical system additions based on their knowledge of the developing market.

Range of applications

Our team have a range of experience in marine, vehicle and industrial applications and are able to work within the parameters of any given project. Working to strict quality and efficiency criteria the panel building team are able to able to deliver on time, to budget each time.

Monitoring and Control

We can design and build AC and DC electrical panels. This can involve generator sets in parallel (isochronous or droop), load management and monitoring. If required we can build remote monitoring and control panels or liaise with other suppliers.



High Quality Manufacturing

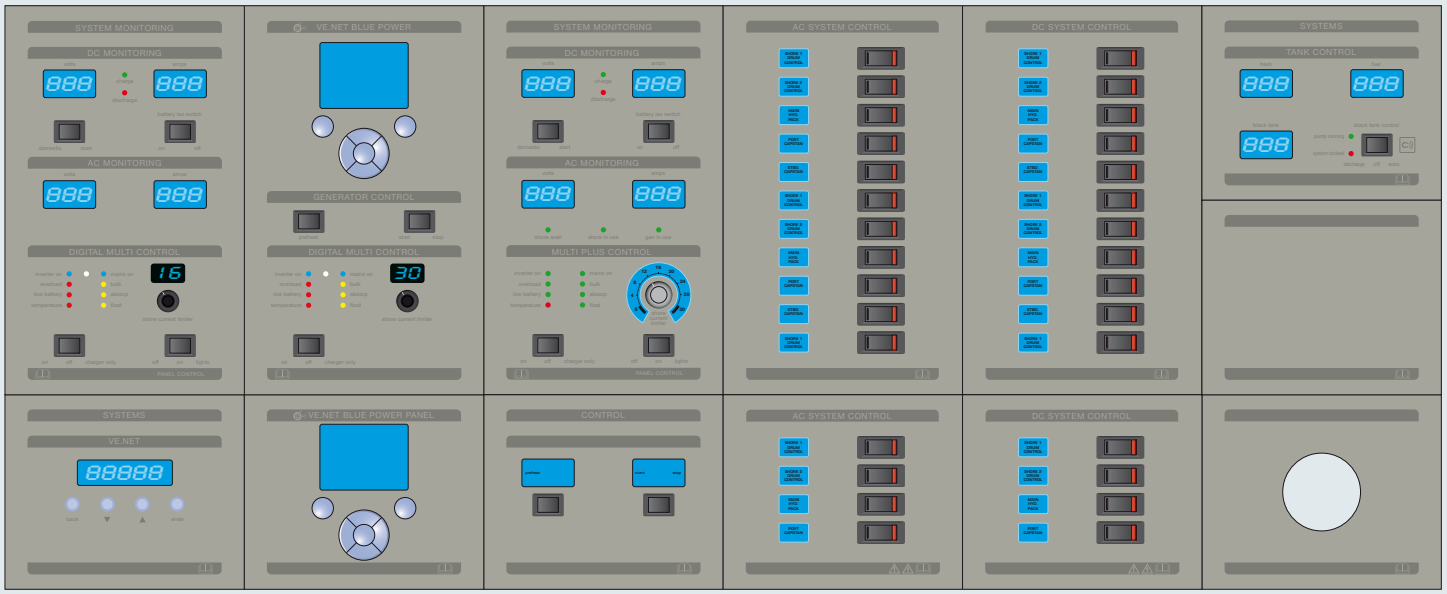
Energy Solutions are highly regarded for their innovative panel design and high quality manufacturing. Each panel is built and hand finished in the UK, then tested and checked before dispatch.

Marine Specialists

Large yachts have complex alarm, monitoring and control requirements. PLC control allows these needs to be met in a flexible and upgradable way. With many years experience working with the leading yacht manufacturers as well as one off super yacht projects the Energy Solutions team can deliver unique panels that address all your monitoring and control requirements.

ESP PANEL SYSTEM

Contemporary off-the-shelf panels



The ESP panel system provides a contemporary designed range of panels that cover the core engineering systems on sail, powerboats and inland waterways craft.

They are designed to work in harmony with the Victron range of electrical power products. Apart from their great appearance they offer the builder or owner huge savings in installation times. The control connections are all made by inexpensive RJ12 or RJ45 patch leads - thus saving time, money and potential errors.

The core of the ESP system is the System control Panel, it allows control and monitoring of your Victron system. The Panel is available in 3 formats (260mm high x 160mm wide).

- **Standard ESP Control Panel**
- **Digital ESP Control Panel**
- **Quattro ESP Panel**

The standard panel allows monitoring of the following:

- Battery voltage (from both service and starter battery
- Battery current (service battery only)
- Control of a remote battery isolator switch
- AC voltage
- AC current
- Indication of availability of AC supplies and which supply is in use.
- Control of the ESP backlighting
- Control of your Victron Multi or Quattro by a standard RJ45

The Quattro Panel is designed for use with a Victron Quattro and a generator, and will provide intuitive control for all devices connected to the VE.Net network. It allows start/stop and preheat of your generator and full control of your Quattro.

ESP DC distribution panel

This panel (260mm high x 160mm wide) contains 11 circuit breakers (1 x 20a, 2 x 16a, 5 x 10a, 3 x 5a) for on board 12 or 24 volt consumers. Additional breakers can be purchased if ratings need to be changed. A four way half size panel version is also available.

The legend plate is backlit. This can be powered directly from the boats DC system (9-32 volts DC) or from the ESP system panel.

ESP AC distribution panel

This panel (260mm high x 160mm wide) contains 11 circuit 1 x 20a, 2 x 16a, 5 x 10a, 3 x 5a) for on board 240 volt consumers. Additional breakers are available if ratings need to be changed. A four way half size panel version is also available.

The legend plate is backlit. This can be powered directly from the boats DC system (9-32 volts DC) or from the ESP system panel.

ESP Tank Control panel

This half size panel (130mm high x 160mm wide) provides complete tank monitoring and pump control for 3 tanks.

The system consists of the following:

- 3 tank senders - which need to be ordered separately
- A pump control box, which is located close to the tanks and pumps.
- The ESP tank control panel.

The pump control box connects to the 3 tank senders via simple Rj12 patch leads. It also has a separate power supply connection (9-32 volts DC) and a data connection to the ESP tank control panel. Inside the box are six relays that can be used to control pumps or alarms. These come pre-configured, but can be programmed for your specific needs for an additional charge.

ESP Control panel

This half size panel (130mm high x 160mm wide) has two switches for configuration by customer. These are supplied as standard as centre off momentary either way. Alternative switch actions can be purchased if necessary. Above each switch is a backlit legend window.

For AC & DC distribution panels and ESP control panels the legend plate is designed to be printed by the user. A template is available as a download and standard laser film is used for printing on.

ESP Blank panel

This half size panel (130mm high x 160mm wide) allows for future expansion.

ESP VE.Net & Blue Power panel

This half size panel (130mm high x 160mm wide) accepts the main elements of a standard VE.Net / Blue Power control panel.

ESP Battery Monitor panel

This half size panel (130mm high x 160mm wide) is built to accept a BMV600 & BMV602.

SYSTEM IN A BOX

A complete solution

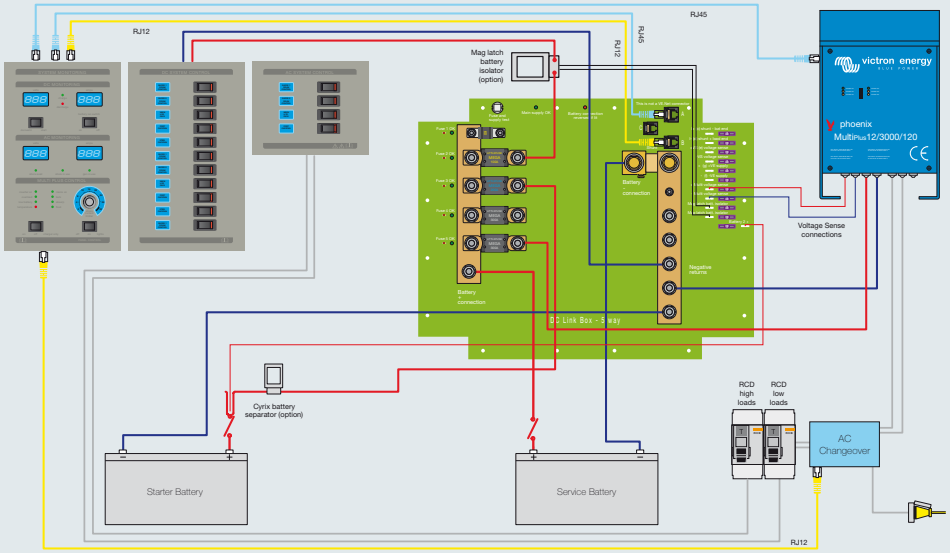
System in a Box is an exclusive Energy Solutions product that incorporates one of the biggest selling products from the core Victron range alongside our own exclusively designed and manufactured components and ESP Panels.

This all-in-one product offers an unrivalled package which gives boat builders and owners all the components they need for a correctly configured, comprehensive power and monitor system.

The system has been designed to be easy to install, making it a full added-value electrical power and monitor solution for end users. There are various versions available to suit different power ratings. The system includes DC Link Box, AC Change Over, ESP System Panel, ESP AC & DC Distribution Panels and all control cables.

ES Phoenix MultiPlus System in a Box

ES Phoenix MultiPlus System in a Box schematic



DC Link Box

The DC link box brings all the primary DC protection, DC monitoring and sensor connections into one simple to fit enclosure. It includes:

- 4 Mega fuses (2 x 300a, 1x 200a, 1 x 100a) and 1 Midi fuse (60a). These can be changed to suit the users requirements. Mega fuses are available in sizes from 100 to 500 amps and midi fuses from 30 to 125 amps.
- 500 amp shunt.
- Test button with LED's for all 5 fuses and a polarity warning LED.
- Fused connection points for Multi voltage sense and BMV 501 connections.
- Fused connections for magnetically latching battery isolator which can be controlled via ESP system panel.
- RJ 11 and 45 socket connections for ESP system panel.

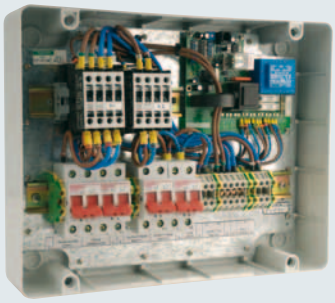
AC Change Over Box

There are 3 models in the range, which cater for differing power levels and different numbers of Multi's.

20 amp rated
This unit can cater for a generator of up to 20 amps rating (approx. 4.8kw continuous) and a 16-amp shore cord. It is designed to work with a single Multi or Multiplus.

32 amp rated
This unit can cater for a generator of up to 32 amps rating (approx. 7.6kw continuous) and a 32-amp shore cord. It is designed to work with a single or twin Multi's. If using a single unit it will need to have an upgraded 32-amp bypass switch.

60 amp rated
This unit can cater for a generator of up to 60 amps rating (approx. 14.4kw continuous) and a 63-amp shore cord. It is designed to work with two or four Multi's. If using two units they will need to have upgraded 32 amp bypass switches.



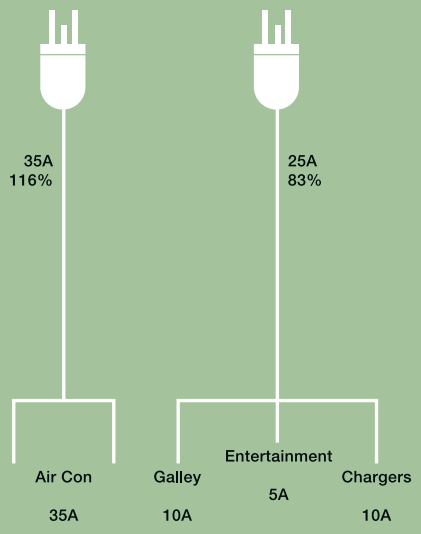
ES DOCKPOWER

Providing a unique power solution

ES DockPower is available in 3 versions:	
DockPower - 2 x 7.5 Kva	
2 x 30 amp	European
H.620mm W.625mm D.450mm	Weight 150kg
DockPower - 2 x 12.0 Kva	
2 x 50 amp	USA
H.620mm W.625mm D.450mm	Weight 216kg
DockPower - 2 x 15.0 Kva	
2 x 63 amp	European
H.620mm W.625mm D.450mm	Weight 240kg
All units require clearance behind for ventilation	

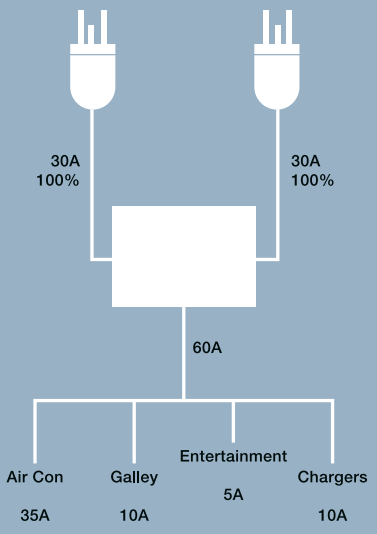
Problem

Standard split bus system can load cords unequally leading to overloads



Solved

DockPower combines two shore cords together maximising capacity



It addresses some key concerns for vessel owners:

- Provides galvanic isolation from the marina supply eliminating concerns about corrosion due to stray earth current.
- Worldwide connectivity with DockPower's universal input, allowing you to plug in anywhere - Europe, Caribbean, USA etc.
- DockPower will condition poor local supplies to give you precisely regulated voltage onboard.

The ES DockPower unit offers a number of other vital safety features:

- Incorporates full isolation transformer functionality for both shore cords.
- Checks that both shore cords are of the correct voltage and phase before connecting them onboard.
- If only one dockside outlet is available it will just connect to one supply.
- If one dockside supply trips or is disconnected, the unit immediately disconnects that cord to ensure voltage is not backfed to the male plug.

AC changover included:

- An automatic changeover system is incorporated as standard & can cater for generators upto 110 A.

Maximising power capacity
The demand for shore power means that larger motor yachts often have dual 32A or even dual 63A shore power sockets. This requires the boat's internal AC circuitry to be split into two entirely separate groups - normally air conditioning and domestic. But if one circuit tries to pull more than the maximum rating there's nothing to be done to stop the dockside load circuit breaker tripping, even if the other cord has plenty of capacity left.

The DockPower isolation transformer range from Energy Solutions solves this problem by allowing boat owners to bring two shorepower leads onto a boat and combine them into a single supply to feed all the boat's loads. The two cords are loaded equally which ensures you get the maximum amount of power on board. Suitable for a range of vessels from large sailing boats to mid-sized motor yachts, DockPower provides an important solution to their specific power requirements.

Designed and manufactured by Energy Solutions, the DockPower range was developed to meet many of the difficulties faced by customers.

Galvanic Protection
Bringing shore power onto a yacht offers a great deal of convenience for the owner, but it can also lead to galvanic corrosion. ES DockPower offers galvanic protection therefore eliminating this problem.

Full product listings, product technical information, general technical information and price lists online at **www.energy-solutions.co.uk**

ES LIGHTNET - Feature rich lighting available with two user control styles

ES LightNet is a sophisticated lighting system with dimmer, mood and colour modules suitable for luxury vessels of all sizes. The system allows vessel owners to create individual lighting effects in different areas as well as allowing global control of the entire system.

In addition the units provide stabilised DC output, so that even if the input voltage fluctuates the DC output remains constant. The result is a consistent ambience and longer life for the system's light bulbs.

Reduced installation time
With simple cabling the ES LightNet system is easy to install. With straight forward programming the intuitive setup is quick.

Because all the modules communicate over a common bus the wiring is simplified and installation time dramatically reduced.

System components

LightNet LightNet Glass

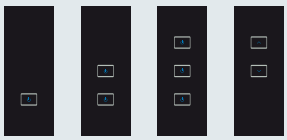
Dimmer Control
An off/resume switch with dimmer control.

Mood Control
Available with 5 presets so that 5 different levels of lighting can be preset for all occasions. Can control up to 10 dimmer modules. SImple, user settable, presets work in a similar fashion to car radio station controls.

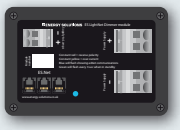
Off / Resume Global
To switch all lights on and off as you enter or leave the vessel. Can be programmed, for example, to leave one light on to allow you to disembark safely. Lights dim to 50% to provide user feedback before turning fully off after a time delay.

Off / Resume Programmable
Programmable switch for controlling lights in a zone on-board. Can be programmed, for example, to turn off all lights in a crew area or lower accommodation. Lights dim to 50% to provide user feedback before turning fully off after a time delay.

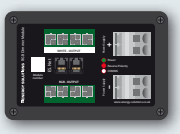
RGB Contol
This control allows for coloured lighting to be incorporated into the mood lighting system. A number of colours can be selected to create a variety of effects. The light intensity can also be controlled.



Hardwired
A matching range of 'Hardwired' controls are available with one, two and three power buttons and an Up / Down control. The units are rated at 5 amps, two way switching is allowed for.

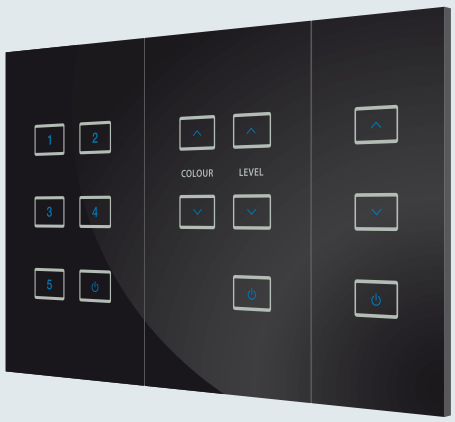


Dimmer Module
This unit provides the power to the lamps. It can accept a 16mm^2 feed which can be looped on to other modules. The unit can be located close to the lamps it is feeding, keeping power wiring to a minimum. It can be used as a dimmer or independently as a voltage stabiliser (controlled only by an off/resume signal).



RGB Dimmer Module
Special version of Dimmer Module for controlling RGB LED lighting.

ES LightNet Glass



ES LightNet dimmer control

Switches
All power buttons stay lit at half brightness when the lights are off for ease of location. All elements of the switches then illuminate when the lights are turned on. All back lighting turns off when the global off signal is received to minimise power consumption.

Intelligent cabling
LightNet uses similar cabling to that of PC systems (RJ12). In addition a high power DC cable is used between each areas dimmer unit, carrying the power required for the lights.

ES LightNet on luxury yacht

ES LOADBANK

Optimising generator capacity

Sizing generators for large sailing and motor yachts is a difficult job. Large variations in onboard power requirements between different seasons, different times of day, and periods with and without guests make for substantial power requirement swings.

Often, despite the very best engineering practice, the yacht will be operating the generators lightly loaded. To address this problem our in-house design and engineering team have developed the new ES Marine LoadBank to be used with Superyacht generators that are running under capacity.

In order to get the maximum life expectancy from a generator it should ideally run at sufficient load to ensure clean running. When a generator runs under capacity it's working life is cut short and the generator runs with soot emissions.

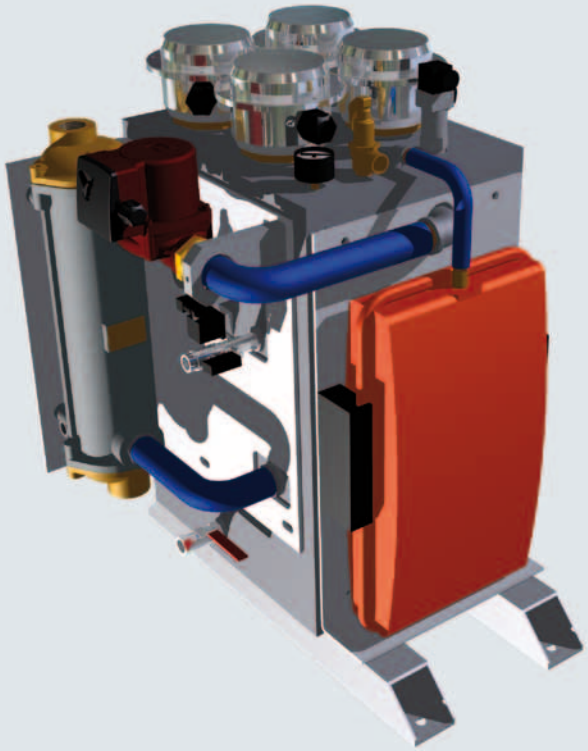
The ES Marine LoadBank is a sophisticated generator loading system that ensures that a sufficient base load is applied to the generator at all times. It uses electrical heaters as a load and this heat is discharged overboard via heat exchangers. The principle is simple – the control is sophisticated.

With an in-house research and design team, specialist engineers and a full technical back up team, they have established a reputation for innovative quality products. The ES LoadBanks are built by their in-house engineering team and supplied to superyachts worldwide.

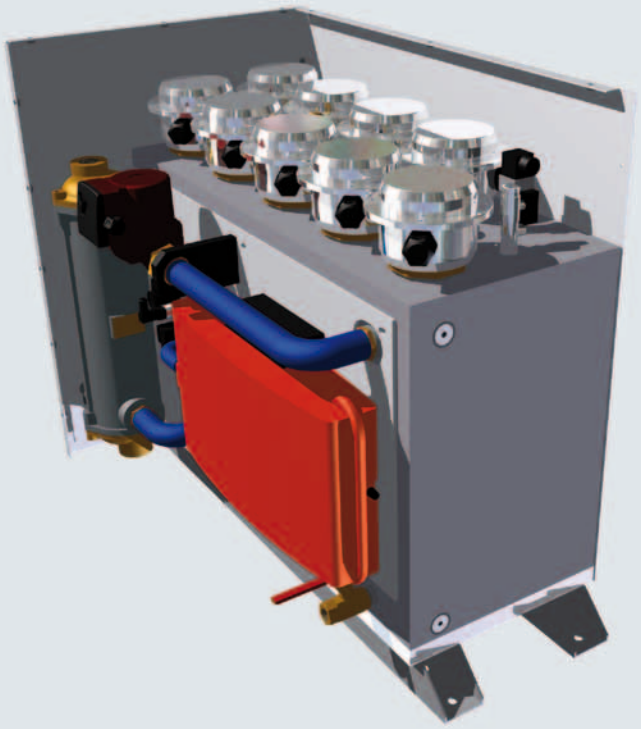
Technical Consultation Service
Energy Solutions offer a complete technical and installation consultation service with the ES Marine LoadBanks. Giving on-site assessment and evaluation to ensure a smooth installation.

LCD Touch Screen Control panel (Optional extra for remote monitoring of all aspects of LoadBank setup and status.)

ES Loadbank Model 18-36kW



ES Loadbank Model 40-80kW



Full product listings, product technical information, general technical information and price lists online at **www.energy-solutions.co.uk**

ES HULL ISOLATION TRANSFORMERS

Single and three phase

Energy Solutions offer single and three phase Isolation Transformers of all capacities. The standard range of Isolation Transformers offer the following features.

Dual input. Each transformer can be configured to accept 110v or 230v input.

Dual output. Each transformer can be configured to provide either 120 - 0 - 120v 4 wire USA output or 0 - 230v 3 wire Euro output.

ABYC compliant. All transformers are built with a screen between primary and secondary windings capable of carrying twice the full load current of the transformer. This exceeds the requirements of ABYC E-8.20.1 by 100%.

Lloyds compliant. All transformers are built to comply with LRS.

Resin coated. The standard protection is a vacuum impregnated resin dip. The option of a double dip with coil end sealing is offered.

The ES LoadBank can be user programmed with generator size and target load. This allows the LoadBank to apply the correct amount of load, per phase, to achieve your target loading. We can also offer direct user control of the unit via a 0-10 volt input. This allows integrated distribution board controls to take control of the LoadBank. Details of the interface and handshake are available on request.

The LoadBank will work with any brand of generator and comes with options such as touch screen remote monitoring panels, remote control panel and flow switches.

Standard units are available at 36kw and 80 kw. Larger systems on request.

Technical Details:

The generator's load can be balanced across the phases.

Programming facility for target loads.

Can receive analogue control input from existing yachts power control system is required (0 - 10V)

Suit any configuration of generators. Standard unit rated at 80Kw. For higher load requirements multiple units can be used.

Can be linked to any make of generator.

Max dimensions:
Height 780mm Width 853mm Depth 790mm

Options:

Touch screen panel for control and monitoring

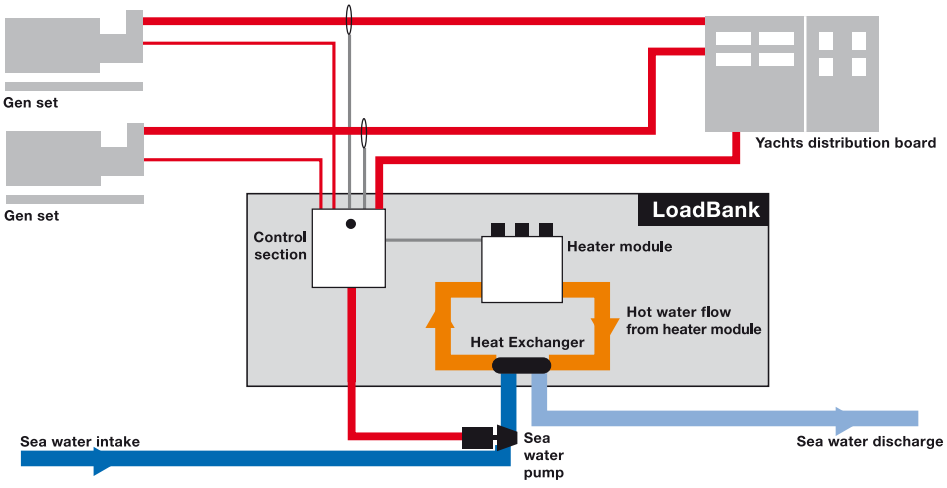
Flow switches – to monitor raw water cooling circuit

Wide range of standard power options:

3.6 kva - 16 amp	@ 230 volt	(32 amp @ 120 volt)
7.5 kva - 32 amp	@ 230 volt	(63 amp @ 120 volt)
12.0 kva - 50 amp	@ 230 volt	(100 amp @ 120 volt)
15.0 kva - 63 amp	@ 230 volt	(125 amp @ 120 volt)

We can offer bespoke transformers to your specifications upto 250 Kva.

ES Loadbank - Integration Diagram



To order: T. +44 (0)1634 290772 E. sales@energy-solutions.co.uk

ES TANK MAPPING INTERFACE

Computational Fluid Dynamics (CFD) Tank Mapping Interface

The ES Tank Mapping Interface allows clients to gain accurate data about the level of fuel left in their tank irrespective of angle, tilt or stability of the vessel or vehicle.

By giving an accurate fuel reading it allows owners to make clear judgements on re-fuelling, speeds and economy, meaning less time returning to harbour to refuel and increased cruising/driving time due to better knowledge of fuel consumption.

It can be used in any onboard tank and the software not only computes variations in angle and tilt, it can also calculate for unusual tank shapes i.e. tapered tanks.

The Tank Interface incorporates a 3 axis interface chip that allows the device to monitor the attitude of the vessel. A 0-10 volt signal from a standard Energy Solutions Tank Sender feeds tank level information into the interface box. The interface box then calculates the precise tank contents based upon tank shape, liquid level and angle.

The information in the Tank Interface is calculated from specialised 3D modelling for each fuel tank design. Using Computational Fluid Dynamics (CFD), Energy Solutions map the tank contents which then provide the basis for the reading from each tank design.

Outputs from the ES Tank Mapping Interface
The Tank Interface takes an input from an Energy Solutions' 0-10 volt tank sender and outputs 3 data outputs:

1. An uncorrected output direct from the tank sender, this will principally be used for calibrating the sender.
2. A corrected 0-10 volt output that accurately details tank contents, with 0 volt being empty and 10 volt being full. This output can be displayed on a simple analogue or digital metre or used as an input into a PLC.
3. RS232 data stream with the corrected tank contents data allowing information to be fed into PC based systems.

In Practice..
The fuel tank on a powerboat may be level when the boat is at rest, but inclined up at the front when the boat is on the plane, it may also be an unusual shape. To avoid fuel starvation the fuel take off point is generally at the rear of the tank. A sender located at the take off point will over read when the tank is inclined as the fuel level at the rear of the tank increases. A fuel sender placed elsewhere in the tank may minimise this problem but records an empty tank prematurely.

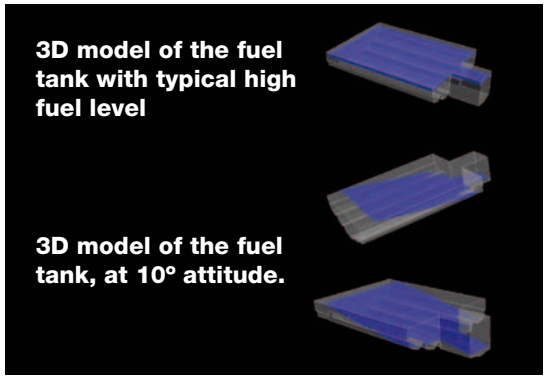
By placing the Tank Sender in this example at the rear of the tank (the fuel take off point), and monitoring the angle of the tank, the system can correctly calculate the true tank contents. The tank angle is calculated in full 3D by an integral 3-axis sensor chip.

Tank Design Charges
There is a one off charge for each fuel tank design. After this the ES Tank Mapping Interfaces can be manufactured in any volume at a unit cost.

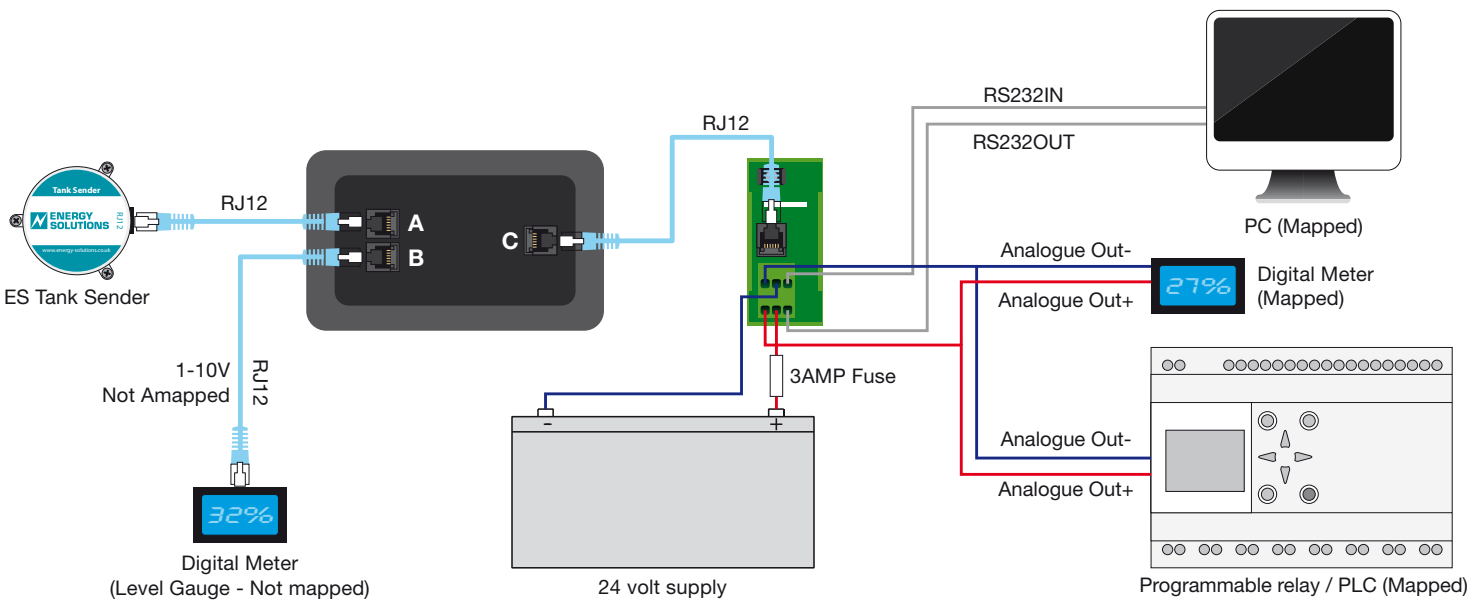
ES Tank Sender

ES Tank Mapper

Tank Modelling

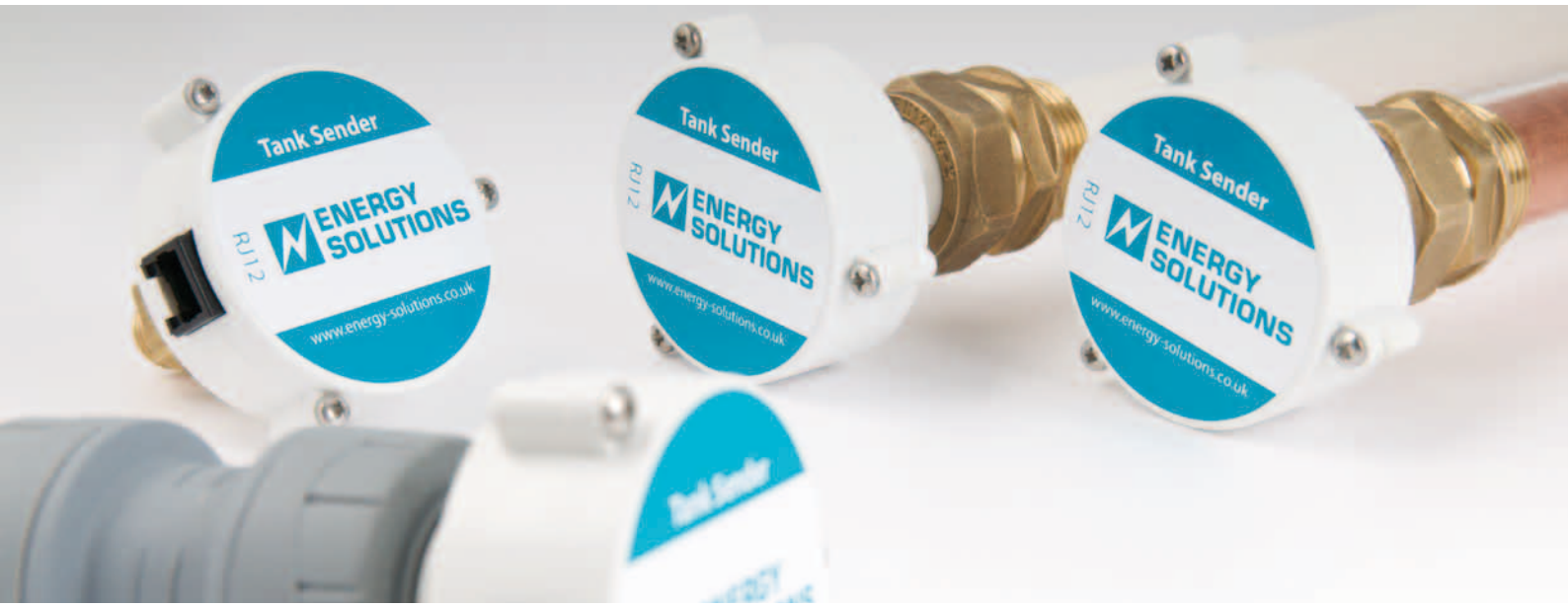


ES Tank Mapping Interface System



ES TANK SENDERS

ES Tank Senders with 0 - 10 volt output



System components

ES Tank Senders

- The tank sender uses a precision pressure transducer to measure the pressure of air trapped in sender body. As the fluid level increases the pressure rises. The unit outputs 0 volts when empty and 10 volts (nominal) when full.
- The sender can generate an output voltage higher than 10V (100%). The sender can be trimmed to display 100% via a trim pot inside the sender head. This needs to be done with the tank full.
- Operates from a nominal 24V DC power supply protected by a 3Amp fuse or circuit breaker
- More than one meter can be driven from a single sender.
- Sender can feed standard instrument, 4-20 mA gauge, PLC or VE.Net module (for network applications).

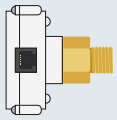
Sender options:

- Plastic bodied sender for tank top mounting - suitable for fresh, grey and black water.
- Plastic bodied sender for pipe work mounting - suitable for fresh or grey water.
- Metal bodied sender for tank top mounting - suitable for fuel.
- Metal bodied sender for tank side mounting - suitable for fuel.

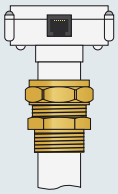
Accessories:

- Tank Mapping Interface
- Damper module for tanks with fluid movement
- Pump control module - operates black tank discharge pump dependant on content level.
- Pump control module - operates fuel day tank pump dependant on content level.
- ES.NET module - monitors 3 senders and controls 6 pump control relays.
- 0-10 Volt to 4-20mA converter module

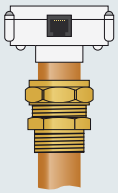
Senders



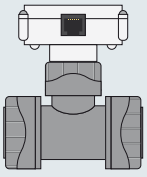
Fuel sender - 1/4”
Mounts into a female socket or ball valve at the bottom of the tank.



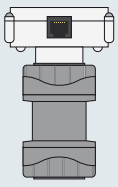
Fresh, Grey and Black Water
Mounts through top of tank with compression fitting or Uniseal.



Fuel Sender
Mounts through top of tank with compression fitting.



Fresh Water Sender
Fits in the take off or balance pipe.

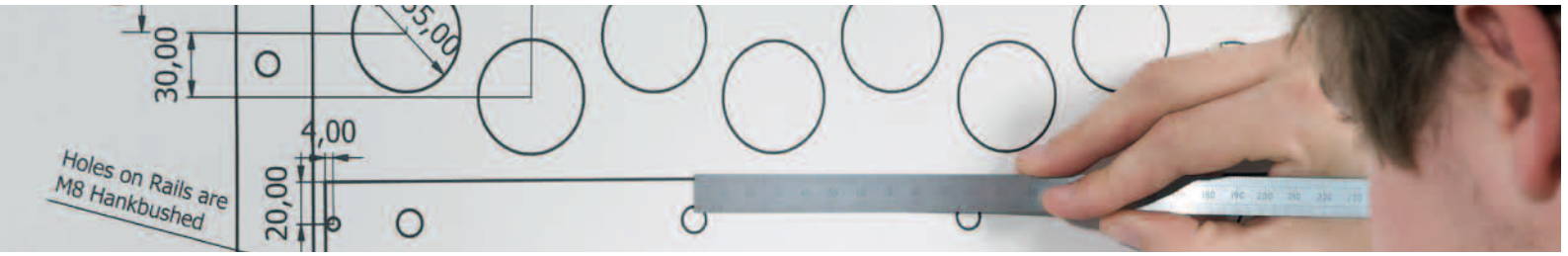


Fresh Water Sender
Mounts into a female socket or ball valve at the bottom of the tank.

To order: T. +44 (0)1634 290772 E. sales@energy-solutions.co.uk

3D DESIGN & TECHNICAL DRAWING SERVICE

From sketch to digital prototype...



We provide bespoke AutoCAD drawing services to businesses who require additional help for their in-house team, or a complete out sourced solution. We can produce working drawings, 3D modelling and technical representations for product designers, manufacturers and engineers.

We work alongside you to develop the drawings but take the details and completely manage the output at our offices, offering you a complete yet out sourced professional service. This allows us to produce technical drawings and designs to satisfy your requirements and deadlines.

Our Software
We use the latest software to generate our drawings and designs:
AutoCAD and Inventor 2010. We can work from any drawings supplied in AutoCAD and we can output for manufacture in DXF, DWG, IGES, STEP and most other commonly used formats.

The Latest Technology
Our latest Software is Autodesk Inventor and AutoCad 2010, this software allows you some significant advantages in a competitive market.

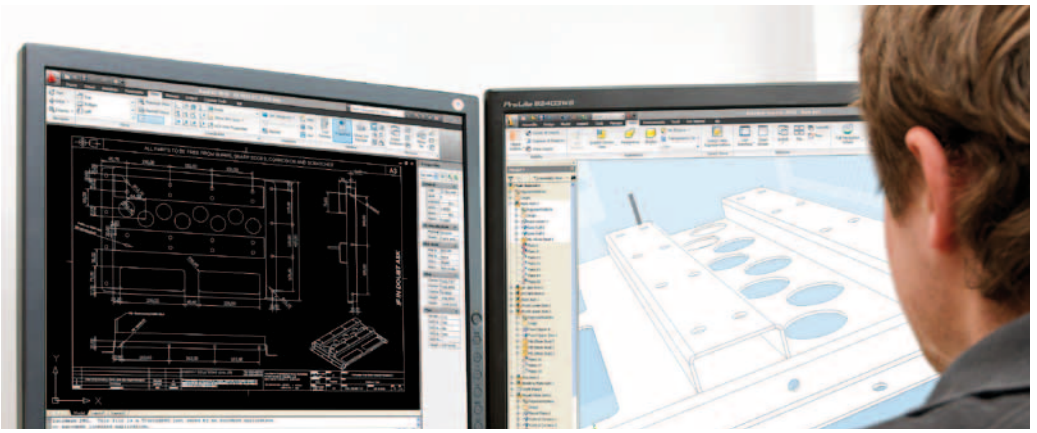
- Make accurate 3D design decisions without building expensive prototypes
- Rapid creation of production-ready drawings
- Increase innovation in existing and new designs while reducing time to market

3D Design
Using the latest 3D modelling software, we're able to convert your existing 2D drawings to 3D models. The process brings your product to life on screen and allows full views both internally and externally ensuring you see an exact representation of your design before going to manufacturing stage.

This advance in AutoCAD design uses exact material representation, it also has facilities to do mechanical tests on the 3D model design (such as interference fit and strength tests).

2D AutoCAD conversion
We also provide a comprehensive 2D CAD draughting service. All types of drawings including architectural, engineering, new products etc can be accurately and manually converted to AutoCAD, DWG and DXF formats from:

- Any type of master drawing produced via the drawing board.
- Drawing blueprints
- Dimensioned sketches
- Marked up prints
- Scanned drawings
- PDF`s, JPEG etc



The service

Technical Drawing
Our 2D and 3D drawing services allow you to get full technical drawings for your products which convey all the required information that will allow manufacturing to produce your product.

Technical Documentation
We can produce literature from engineering drawings, method statements, or the finished product. This literature will allow users to operate products safely and will ensure the product is in conformity with the information disclosure requirements of any standards or legislation required.

Technical Documents
- Operation & Maintenance Manuals
- Parts Manuals
- Instruction Manuals
- Specifications, Sales Data Sheets, etc

Benefit of using our service
- Adhoc – you can use our service as and when required, from one project to on-going
- Lower overheads – out source your requirements rather than work inhouse
- Latest software – we have the latest software which puts you ahead of the competition

Sales Tool
Use your 2D and 3D drawing as a sales tool for your business. Our designs can be produced on paper and disc and give you a powerful demonstration tool of your products. Video clips and designs can also be displayed in your sales literature and web sites.

Experienced within:
- Marine
- Vehicle
- Mobile industries
- Manufacturing
- Electronics
- Electrical engineering
- Product development
- Structural Design

Examples of our service
- 2D to 3D
- Sketch to CAD
- Product to Technical Drawing
- Product/technical drawing to Datasheet
- Design Prototyping

Full product listings, product technical information, general technical information and price lists online at **www.energy-solutions.co.uk**

ES AUTOMATED LOOM SYSTEM

Custom cable assemblies and wiring looms

Energy Solutions offers a full service, completely automated, outsourced manufacturing department for custom cables, cable assemblies, cable harnesses and wiring looms.

The department offers a full design and consultancy service which allows us to work with you to understand your exact requirements. Working with your production and project teams we endeavour to bring a fast turnaround to your projects.

- Custom cables
- Cable assemblies
- Cable harnesses
- Wiring looms
- Ink-jet wire marking
- Sets of pre-terminated wires
- Control panel manufacture and assembly
- Cable kits for panel builds

We offer a wide range of cables up to 70mm for customers who wish to use our range. All cables are tri-rated as standard and cables over 10mm cable are all high flex. Outside of these stock products we are happy to supply cable to your own specifications.

Experienced
We have experience across a range of industries, and work with some of the leading companies in each sector:

- Marine
- Industrial
- Communications
- Specialist automotive

Current projects include:
- Wiring looms for OEM boat builders
- Cable kits for panel assembly
- Lighting looms

Consistency and Reliability
We have an experienced team who focus on delivering to schedule with a consistently high quality product. All production takes place at our main site in Rochester, Kent and goes through quality checks and testing. However, we are aware that plans change and we have the capacity to adjust production as required to ensure we deliver exactly what your project needs.

Our process

We pride ourselves on a structured yet fast process to ensure that we deliver exactly what you need. Our dedicated team are available to work with you throughout the project and installation.

- Initial consultation
- Quotation
- On site visit
- Design assistance
- Schematic drawing
- Final consultation
- Work commences

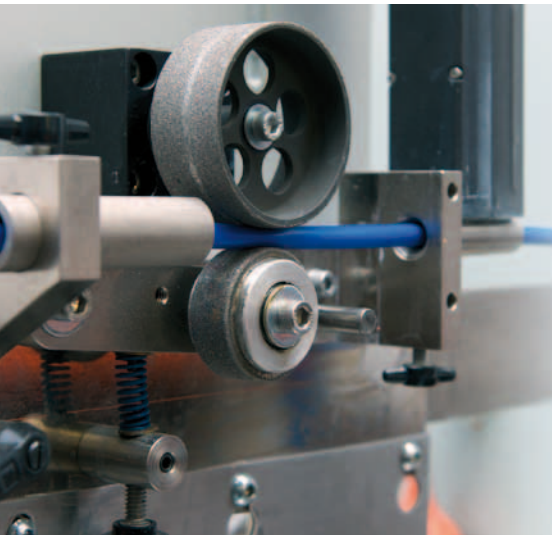
Our system also includes cable printing, wire marking and additional cable preparation as required, ensuring you get a correctly marked and fast to install end product. This helps cut down on installation time, labour requirements and additional documentation.

Our success is based on meeting your requirements and delivering on-time, whether it is a one-off project or an on-going production build.

Key Benefits:
- Outsourced manufacture – reduces overheads and capital costs
- Latest equipment – fast and cost effective production
- Design consultancy service – expert help to ensure correct specification.

Experience in marine, automotive and industrial sectors – understanding of the complexities allows greater speed and enhanced end products.

The system



Why use our system?
Totally electronic and fully programmable, our system features two breakthrough technologies: a micro controller system that's been custom designed to control the most demanding wire stripping applications; and a powerful servo-driven design, able to provide a degree of speed and accuracy that's simply not possible with stepper motor designs.

Our system also has its own computer– a powerful tool for fast and easy data management. Not only does it utilise a standard PC operator interface, but it has a memory capacity that's virtually unlimited, enough to store and recall all important machine functions for all applications: wire size and length, strip lengths, number of pieces, etc. In addition the system has software allowing on or off-line programming which allows us to update programming without stopping production.

Cable/Wire Printing
We are able to print full alphanumeric data onto cable up to 35mm, with a 90 characters text capacity.

Printed Heat Shrink Labels
We offer a service to print heat shrink labels. These are available in a wide range of sizes and colour, please call for information and availability.

Cable Assembly Technical Data

Cable size: Up to 70mm

Wire Cutting Lengths:

Minimum: 1/4" (6.4mm)

Maximum: 3900" (100M)

Wire Stripping Lengths:

Minimum: Programmable to 0.01" (.254mm)

Maximum: 39" (1000mm) wire dependent

victron energy

VICTRON INVERTERS, BATTERY CHARGERS & MULTIS

VICTRON MULTI

The Multi / MultiPlus combines an inverter, battery charger and automatic switch over device in a single compact housing. It's PowerControl and PowerAssist functions make it the heart of the power management system onboard.

When external AC power (from a shore supply or generator) is available the Multi works as a battery charger and supplies the AC loads connected to its output from the mains supply.

On losing the AC supply the Multi supplies the AC loads on its output from its Sine wave inverter section.

The transition from mains to inverter and visa versa is so quick that computers and electronic clocks continue to function without disruption.

The MultiPlus version uses Inverter power to boost the supply from shore or generator to help with short term high power loads, on all models except the 800Va.

New Phoenix EasyPlus

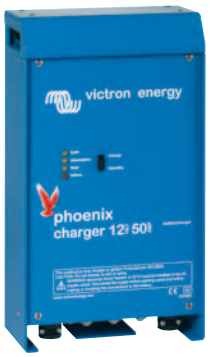
For the more straightforward applications Victron have taken the 'all in one' concept to it's ultimate end in the form of the EasyPlus.

This model has everything you get from MultiPlus with the addition of an in-built RCD and MCB's for AC power distribution. So you no longer need a separate circuit breaker panel. With battery cables fitted and the AC connections being plug-in (as for all compact models) installation could not be easier. The EasyPlus truly is a complete power system in one box.

Model	Inverter Va	Charger amp
12 volt models		
C12 / 800 / 35 16A	800	35
C12 / 1200 / 50 + 16A	1200	50
C12 / 1600 / 70 + 16A	1600	70
12 / 1600 / 70 + Easy	1600	70
C12 / 2000 / 80 + 30A	2000	80
12 / 3000 / 120 + 16A	3000	120
12 / 3000 / 120 + 50A	3000	120
48 volt models		
48 / 3000 / 35 + 50A	3000	50
48 / 5000 / 70 + 50A	5000	70

Model	Inverter Va	Charger amp
24 volt models		
C24 / 800 / 16 16A	800	16
C24 / 1200 / 25 + 16A	1200	25
C24 / 1600 / 40 + 16A	1600	40
C24 / 2000 / 50 + 30A	2000	50
C24 / 3000 / 70 + 30A	3000	70
24 / 3000 / 70 + 16A	3000	70
24 / 3000 / 70 + 50A	3000	70
24 / 5000 / 120 + 50A	5000	120

VICTRON CHARGERS



Victron offer 4 ranges of chargers to suit differing applications. All chargers share the same high quality engineering.

Blue Power
- Wide input voltage (200-265v or 115-265v dependent on model)
- 3 stage charging with 1 main output
- Water proof models available to IP65

Centaur
- Universal input voltage (90-265v)
- 3 stage charging with 3 main outputs
- UL compliant

Phoenix
- Universal input voltage (90-265v)
- Adaptive 4 stage charging with 2 main outputs & 1 aux
- Battery safe & storage modes
- Computer interface via RS-485 data port

Skylla
- Wide input voltage (185-264v)
- 3 stage charging with 1 main output & 1 aux
- Temperature compensation & alarm outputs

Centaur 12v	Centaur 24v	Skylla	Phoenix	Blue Power
12 / 20	24 / 16	24 / 30	12 / 30	12 / 7
12 / 30	24 / 30	24 / 50	12 /50	12 / 10
12 / 40	24 / 40	24 / 80	24 / 16	12 / 15
12 / 50	24 / 60	24 / 100	24 / 25	24 / 5
12 / 60	24 / 80	24/50 & 24/100 3 phase		24 / 8
12 / 80	24 / 100		Blue Power IP65	
12 / 100		48 / 25	12 / 7	24 / 3
12 / 200		48 / 50	12 / 17	24 / 12

Full product listings, product technical information, general technical information and price lists online at **www.energy-solutions.co.uk**

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VICTRON INVERTERS

The Phoenix inverters are the most advanced available for professional power systems in marine, mobile and industrial applications.

Developed for professional duty, the Phoenix range of inverters are suitable for the widest range of applications. The design brief was to produce a true sine wave inverter with optimised efficiency but without compromise in performance. The result is a top quality product with compact dimensions, which are well suited to powering up difficult loads such as refrigeration compressors, electric motors and similar appliances.

	Model	Cont. Va	Peak W
12V	12 / 180-230V-IEC	180	200
	12/350-230V-IEC	350	500
	12/750-230V-IEC	750	1400
	C 12/1200-230V	1200	2200
	C 12/1600-230V	1600	2300
	C 12/2000-230V	2000	4000
	12/3000-230V	3000	6000
24V	24/180-230V-IEC	180	200
	24/350-230V-IEC	350	500
	24/750-230V-IEC	750	1400
	C 24/1200-230V	1200	2200
	C 24/1600-230V	1200	3000
	C 24/2000-230V	2000	4000
	24/3000-230V	3000	6000
	24/5000-230V	5000	7500
48V	48/350-230V-IEC	350	500
	48/750-230V/50Hz-IEC	750	1400
	48/3000-230V	3000	6000
	48/5000-230V	5000	7800

VICTRON QUATTRO

Virtually unlimited power thanks to parallel operation. Up to 6 Quattros can operate in parallel to achieve higher power output. Three phase or split phase operation is also possible.

Two AC inputs
Two AC inputs with integrated transfer switch
The Quattro can be connected to two independent AC sources, for example shore-side power and a generator, or two generators. The Quattro will automatically connect to the active source.

Two AC Outputs
The main output has no-break functionality. In the event of a grid failure, or shore or generator power being disconnected, the Quattro takes over the supply to the connected loads. This happens so fast (less than 20 milliseconds) that computers and other electronic equipment will continue to operate without disruption. The second output is live only when AC is available on one of the inputs of the Quattro. Loads that should not discharge the battery, such as air-conditioning or a water heater can be connected to this output.

Unique PowerAssist feature
The Quattro will prevent overload of a limited AC source. First, battery charging will automatically be reduced when otherwise an overload would occur. The second level will boost the output of a generator or shore side supply with power taken from the battery.

Quattro inverter / charger

Model	Inverter Va	Charger amp
12 volt models		
12 / 3000 / 120 50/30A	3000	120
24 volt models		
24 / 3000 / 70 50/30A	3000	70
24 / 5000 / 120 30/30A	5000	120
48 volt models		
48 / 5000 / 70 50/30A	5000	70

victron energy

VICTRON BATTERIES

12V DEEP CYCLE AGM, DEEP CYCLE & LONG LIFE GEL 2V

AGM stands for Absorbent Glass Mat. In these batteries the electrode is absorbed into a glass-fibre mat between the plates by capillary action. AGM batteries are more suitable for short time delivery of very high currents (i.e. engine starting) than Gel batteries.

Gel batteries have the electrode immobilised in Gel. They generally have a longer service life and better cycle capacity than AGM batteries.

VRLA AGM: design life 7-10 years
VRLA GEL: design life 12 years
VRLA GEL 2 volt cells: design life 20 years

The AGM range has very low internal resistance making them particularly suitable for high current discharge applications such as for inverters, thrusters and winches as well as engine starting.

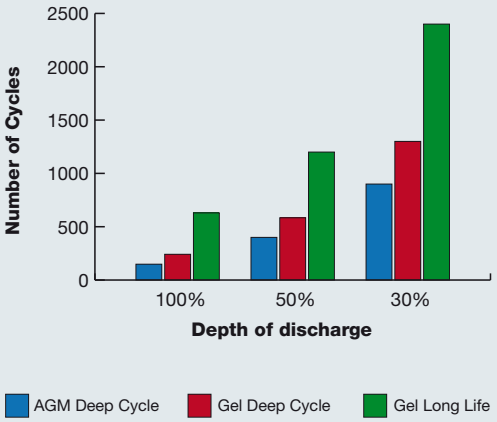
The GEL model range offer best deep cycle durability and overall longer life.

The use of high purity materials and lead calcium grids ensure that for both AGM and GEL products have particularly low self discharge so that they will not go flat during long periods without charge.

Manufactured under ISO 9002 quality standards, they are compliant with both CE and UL specifications in ABS fireproof containers and come with Victron's 2 year world-wide warranty.

Victron VRLA Batteries offer a range of benefits:

- Victron VRLA (Valve Regulated Lead Acid) batteries have exceptional leak resistance and can be used in any position.
- VRLA Batteries are maintenance free for life.
- VRLA AGM batteries are more suitable for short-time delivery of very high currents (engine starting) than gel batteries.
- Gel batteries in general have a longer service life and better cycle capacity than AGM batteries.
- VRLA batteries can be stored for long periods of time without recharge.
- VRLA batteries can be stored for up to a year without recharging if kept under cool conditions.
- VRLA batteries have exceptional discharge recovery, even after deep or prolonged discharge.
- VRLA AGM Deep Cycle batteries have excellent high current performance.



12 Volt Deep Cycle AGM			12 Volt Deep Cycle Gel			2 Volt Long Life Gel		
Model	Ah	V	Model	Ah	V	Model	Ah	V
AGM-012	12	12	GEL-055	55	12	2VGEL-800	800	2
AGM-035	35	12	GEL-060	60	12	2VGEL-1000	1000	2
AGM-055	55	12	GEL-080	80	12	2VGEL-1500	1500	2
AGM-060	60	12	GEL-100	100	10	2VGEL-2000	2000	2
AGM-080	80	12	GEL-120	120	12	2VGEL-3000	3000	2
AGM-100	100	12	GEL-150	150	12			
AGM-120	120	12	GEL-200	200	12			
AGM-150	150	12						
AGM-200	200	12						

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victron energy

BATTERY MONITORING

BMV-600 and BMV-602

The BMV-600 and BMV-602 are our newest high precision battery monitors. The essential function of a battery monitor is to calculate ampere-hours consumed and the state of charge of a battery. Ampere-hours consumed are calculated by integrating the current flowing in or out of the battery.

- Highest resolution: 10mA (0,01A) with 500A shunt.
- Lowest current consumption: 1mA.
- Easiest to wire: the BMV-600 comes with shunt, 10 meter RJ 12 UTP cable and 2 meter battery cable with fuse. No other components needed.
- Easiest to install: separate front bezel for square or round appearance; ring for rear mounting and screws for front mounting.

The BMV-602 has a second voltage measurement input. This input can for example be used to measure the voltage of a starter battery.

VE.NET

VE.Net Panel

A modular network
An easy-to-install low-power network, VE.Net is an integrated package of modular units that interact to provide control and monitoring of your electrical systems such as your battery or inverter.

VE.Net Panel – information at your fingertips
The VE.Net panel gives you at-a-glance information on the status of your on-board equipment providing you with details on the condition of your battery, inverter or battery charger. The VE.Net Panel is a plug-and-play display and control panel which automatically detects all devices connected to the network. All the information you need is at your fingertips on a single interface.

VE.Net Connectivity Module - information wherever and whenever you want
The VE.Net add-on connectivity module can be accessed via a secure, password-protected website which enables you to control and monitor whenever and wherever you are. Alternatively, messages can be sent to the system by SMS, to switch devices on or off. In fact, almost any on-board function or device can be connected to the system.

Why VE.Net?
- Fewer cables, less weight, fast and low-cost installation
- Stay fully informed: whenever and wherever you are
- All information displayed on a single, easy-to-read panel
- Remote monitoring and control: optimum comfort and safety
- Plug and play: no set-up needed
- Built-in GPS system

VICTRON ACCESSORIES

Remote Panels:
- Phoenix Multi Panel (PMV)
- Charger Mode (CMV)
- Inverter Control (ICV)
- Charger Current (CCV)
- Charger Output (COV)
- Charger Switch (CSV)
- AC Outlet (AOV)
- Battery Alarm (ALV)

Battery Protect:
- Automatically disconnects non essential loads when battery falls below set voltage
- 25 & 60 amp versions available

DC to DC converters:

Non isolated converters
- 24v to 12v (5, 8, 12, 20 & 30 amp)
- 12v to 24v (7 & 10 amp)

Isolated converters
- 3 power ratings (100, 200 & 360 watt)
- 4 Input voltages (12, 24, 48 & 96 volts)
- 2 output voltages (12 & 24 volts)

Battery charging converters
- Charge a 24v battery from a 12v supply. 12 amp

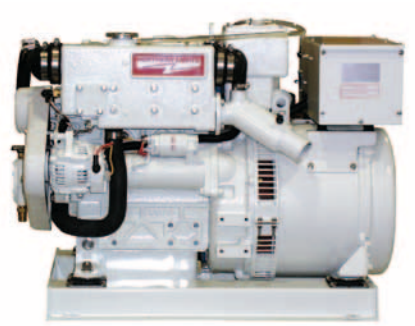
Diode Isolators
- Schottky diodes for low volt drop
- 2 battery units (70, 120 & 160 amp rated)
- 3 battery units (70, 120 & 160 amp rated)

Diode Combiners
- Supplies essential circuits from 2 different batteries
- 30 & 70 amp versions

Cyrix Battery Combining relay
- Automatically connects 2 batteries when either one is being charged
- 12 & 24 volt versions (80, 160 & 400 amp)

NORTHERN LIGHTS GENERATORS

4.5 KW TO 285 KW



- **Favoured by Superyachts, available for world class yachts of all sizes.**
- **4.5 to 285 Kw.**
- **Slow running, refined diesel generator sets.**
- **The widest range of options to meet your needs.**
- **New W series - with an auxiliary stator winding that supplies separate and stable power to the AVR.**

Energy Solutions are the sole agent for Northern Lights generators, engines and spares in the UK and are experienced in helping customers meet their requirements.

Northern Lights special features include:

1. Five-Year Warranty
Included on all 4.5 - 26kW Northern Lights generator sets.

2. IMO Compliant
Northern Lights generator sets meet all pending International Maritime Organization emissions standards.

3. Front Power Take Offs
Optional on 12kW and larger sets, to run shipboard hydraulics.

4. Sound Enclosures
Marine aluminium enclosures that reduce sound levels but provide service access.

When you need reliable power turn to Northern Lights.

Northern Lights started building generator sets in 1963. Since then, thousands of sets have gone to work providing electrical power all across the world. If you work or play on the water, Northern Lights marine gen sets power everything from small boats to yachts to passenger ferries.

The Finest Engines
Northern Lights uses base engines from the finest manufacturers including John Deere and ISM. All are designed for heavy-duty applications. Energy Solutions can help you pick the right diesel engine for your application.

Clean Running
IMO Compliant Northern Lights and have always run cleanly. Each unit sold is compliant with IMO regulations.

Fuel Economy
Fuel is your largest operating expense. That is why Northern Lights engines have low fuel consumption rates. Compare and see how this fuel economy will cut your costs.

Keep It Simple
Northern Lights' products are easy to install, operate, and maintain. You don't have to be a mechanic to maintain them or an engineer to read the operator's manuals.

Testing
Every set, every engine, is fully load tested with its options and its controls. Your unit is right when you take delivery.

Spares and Service
Energy Solutions provide all the spare parts and service you may need. Our service engineers can advise you on how to correct a problem yourself or fix it for you.

Custom Power Systems
Northern Lights' application engineers specialise in using standard engines as a foundation for custom power systems built for your requirements using a long list of integrated optional equipment.

Full product listings, product technical information, general technical information and price lists online at **www.energy-solutions.co.uk**

ACCESSORIES & SPARES

Sound Enclosures
The highest performing enclosures in the industry, Northern Lights sound shields are designed and tested to attenuate ip to 20 dba. Trigger latch panels open to single-side serviceability and their white, power-coated finish is as durable as it is elegant.

Fuel Filter
Thoughtfully mounted fuel filter is easily serviced and designed to reduce fuel spills. Large top mounted air bleed and fuel pump priming lever provide for fast, painless fuel filter changes.

Dry Exhaust Flex
Connects the exhaust system to the engine and reduces vibration transmission through the dry exhaust. Also allows for remote mounting of the muffler and compensates for the themal expansion of the exhaust system.

Fuel Pump
Adds design flexibility by allowing the fuel tank and generator to be installed further apart. Also allows easier fuel system bleeding.

On Board Spare Parts Kit
Belts, gaskets, o-rings, pumps, and much more. Be prepared and organized for routine maintenance and troubleshooting in tough marine environments. Standard Kit contains and organizes basic repair parts, and the World Class Kit outfits you for longer voyages.

NORTHERN LIGHTS INDUSTRIAL

Northern Lights unmatched reputation for durable and reliable power solutions began with our land-based line. From the extremes of the Arctic North slope to the deserts of the Middle East, Northern Lights industrial generator sets have proven their mettle for over four decades.

With unmatched versatility and quality, Northern Lights industrials are engineered to keep the lights on economic operation, but never at the expense of reliability. Whether your application is prime or stand-by, 50 Hz or 60 Hz, Northern Lights has a land-based solution for you.

No matter whether it's a job site, a hunting camp, or a remote telecommunications station, Northern Lights offers the superior engineering and technical precision to bring you reliable power.

Special Features

- Four cycle, 3 cyclinder liquid cooled, natuarally aspirated, overhead valve, industrial-duty diesel.
- Indirect injection with glow plugs for fast cold weather starts.
- Based on heavy-duty tractor engine blocks customised for optimal prime power production.
- With proper maintenance they have logged over 25,000 hours.
- Low torque operating at 1800 rpm or 1500 at 50Hz, they exhibit less wear and tear than the competitors' light weight intermitent duty 3600 rpm gensets.
- To ensure ease of maintenance all key service points are on a common side. Low oil pressure and high coolant temperature shutdowns protect your investment.
- Liquid cooled with radiator and pusher cooling fan. Steel radiator shroud and fanguard protects the radiator and operator.
- Four centreboned mounts isolate vibration.
- Large, replaceable air filter protects engine in dusty environments.

LUGGER MARINE DIESEL ENGINES

30 TO 700 HP

Lugger engines by Northern Lights feature many components designed for outstanding performance and cost efficiency. Recognised world wide as the most reliable and durable marine engines, Lugger delivers the highest quality engines on the water.

All Lugger engines, are highly customisable, and have spare part availability; providing for a remarkably flexible and adaptable marine propulsion unit.

Special features include:

1. Three-Year Warranty
Included on all Lugger diesel engines.

2. Custom Built
Each Lugger is custom built with the special equipment your vessel needs.

3. Heavy-Duty
Engine blocks from the world's leading manufacturers.

4. Inline Design
For ease of installation and service.

5. Low Fuel Consumption Rates
For lower operating costs.

6. IMO Compliant

7. Power density
Available high pressure common rail models offer high horse power from a small physical footprint.

AQUALUMA™
UNDERWATER LIGHTING

UNDERWATER LIGHTING & CAMERA

LATEST TECHNOLOGY FOR MARINE AND UNDERWATER APPLICATIONS

3 Series

The unique feature of the Aqualuma light is in its construction. With no lens seal there is no leakage, and any maintenance can be performed by internal access, without compromising water tight seals.

Built from 1 piece injection moulded polycarbonate housing there is no metal, no corrosion and no bonding required. They have a high output LED light engine that is immensely bright and available in three colours: green, blue and white.

The lights can be used with any type of hull: Aluminium, Steel, Timber & Fibreglass. Fitting of this incredible light is as simple as drilling a 60mm (2.3/8in) hole; applying the sealer provided, sliding the light into the hole; tightening the nut and connecting the positive & negative wire. The Aqualuma products all carry a 2 year Warranty.

6 Series

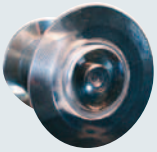
This new larger option has been designed in response to the large number of requests from the world's super yacht industry.

The construction is the same as the proven AQL 3 series, corrosion proof, injection moulded polycarbonate, internally driven and maintained.

Tri Colour

Utilising the brilliance of the 3 series and the body of the 6 series is the Tri Colour. With the choice of two colours in the one housing, it gives you three options. You choose to operate either one of these colours for the amazing light show of the AQUALUMA 3 series or run them together and get a mix of the two with the intensity of the AQL 6 series.

The AQUALUMA Tri Colour is available in three models. Blue & White, Blue & Green or Green & White.



Luma-Vu - New Thru-Hull Underwater Camera

Aqualuma Underwater Lighting's Luma-Vu system combines a high-definition colour closed circuit television camera fully enclosed in the company's one-piece polycarbonate housing. This corrosion proof, non-conductive, nearly indestructible housing is the same one used in the construction of Aqualuma Underwater Lighting's LED underwater lighting systems, currently found on top sportfishers, yachts and megayachts around the world.

The Luma-Vu camera's housing is built to take a pounding at sea and can safely survive accidental impact with floating debris. Aqualuma Underwater Lighting's Luma-Vu has a variety of recreational and professional marine applications, including sport and commercial fishing, diving, snorkelling, survey/ research, security, or just exploring.

Lighting Technical Information:

- One piece injection moulded high impact polycarbonate housing
- No electrical bonding to anodes, can not corrode
- Suitable for any hull material
- No seal to leak
- Virtually bulletproof/pulse tested to over 1300ft below the surface
- Smooth external protrusion, low drag for fitting to sides of vessel
- Latest technology high intensity LED light engine, 40-50K hour life expectancy
- Very low heat emission, can be operated out of water
- Shock and vibration resistant, no filament
- Internal driver, only 2 wires to connect +/- 12/24v dc
- Low current draw less than 1/2 an amp @12v
- Standard or wide beam optics
- Maintenance done from inside vessel

Full product listings, product technical information, general technical information and price lists online at **www.energy-solutions.co.uk**

SOMY BOILERS & CALORIFIERS

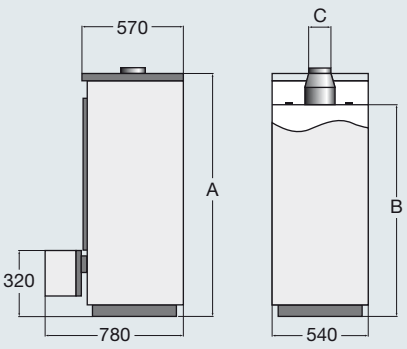
SOMY BOILERS

The Somy range of ship's heating systems offers effective and reliable solutions for your on board requirements. The range was proven in the inland commercial shipping market in Holland where its reputation spread to off shore commercial operators, Ferries, Tugs, and lately private vessels from narrow boats through to large yachts. The Delta incorporates a stainless steel calorifier rated at 10 Bar for high pressure pumped systems. The high recovery rate offered by the tank in tank design offers continuous quantities of hot water for high demand applications. Separate calorifiers are available for boiler based systems or for hot water generation, using waste engine heat.

SOMY CALORIFIERS

Somy calorifiers feature a specially designed TIG welded stainless steel hot water cylinder which is enclosed in an outer tank heated by a boiler or waste engine heat. These cylinders are ideal for use with pumped water systems as they are designed to operate at up to 10 Bar. The whole inner cylinder acts as a heating surface meaning far faster heating rates and no stratification. The fast heat up rate combined with superb insulation gives unrivalled flow rates to satisfy even the most demanding users. Apart from the standard range we can supply cylinders up to 1800 litres.

SOMY DELTA



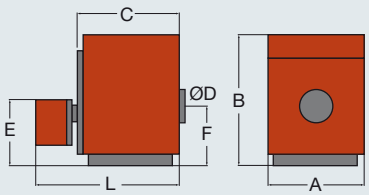
The Delta boiler has an integral stainless steel calorifier. The flue gasses pass through the calorifier transferring residual heat to the domestic hot water. This makes the Delta an extremely efficient boiler for vessels with limited 240V electrical capacity. The top flue connection gives the unit a very small foot print.

Model	F25	F35	F45
Kw output	23-33	33-45	41-61
Dim. A(mm)	1497	1697	1497
Dim. B(mm)	1260	1460	1260
Dim. C(mm)	130	150	150
Hot water Capacity	75L	75L	65L
Hourly hot water Output@45°c	799L	1027L	1334L
Max working pressure hot water	10BAR	10BAR	10BAR

Smartline Calorifiers for vertical mounting only.
With immersion.

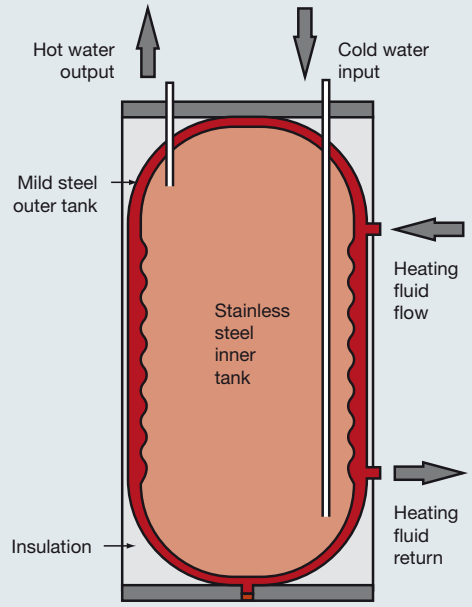
Model (SL)	130	160	210	240	320
Total capacity	130	161	203	242	318
Heating fluid cap. (L.)	55	62	77	78	55
Hot water capacity (L.)	75	99	126	164	263
Flow rate (L. per hr.)	2100	2600	3500	4200	6200

SOMY COMPACT



The Compact Boiler Range is ideal for applications where there is a separate hot water calorifier or for installations where only heating is required.

Model	C0814	C2028	C2836	C3650
Kw Output	10-14	23-32	32-42	42-58
Dim. A(mm)	368	470	470	530
Dim. B(mm)	635	700	765	805
Dim. C(mm)	490	566	566	656
Dim. D(mm)	75	130	130	150
Dim. E(mm)	340	340	340	340
Dim. F(mm)	420	445	510	550
Dim. L(mm)	700	780	780	875



To order: T. +44 (0)1634 290772 E. sales@energy-solutions.co.uk

Ratio ELECTRIC

SHORE POWER SYSTEMS & CORD SETS

RATIO MP16 & MP32 SHORE POWER SYSTEM

Product List

API-RATIO-2P-E/16/240/SS	Ratio Stainless steel shorepower inlet. 2P+E. 240v 16 A.	SHORECORD-MARINCO-16A/15M	Shorecord Set - 3 core - 2.5mm - 16A - 15m
API-RATIO-2P-E/32/240/SS	Ratio Stainless steel shorepower inlet. 2P+E. 240v 32 A.	SHORECORD-MARINCO-16A/25M	Shorecord Set - 3 core - 2.5mm - 16A - 25m
API-RATIO-2P-E/63/240/SS *	Ratio Stainless steel shorepower inlet. 2P+E. 240v 63 A.	SHORECORD-RATIO-10A/15M	Shorecord Set - 3 core - 1.5mm - 10A - 15m
SHORECORD-BAG-RATIO	Shorecord organiser and storage bag.	SHORECORD-RATIO-10A/25M	Shorecord Set - 3 core - 1.5mm - 10A - 25m
SHORECORD-EXTENS-10A/15M	Shorecord extension cable - 3 core - 1.5mm - 10A - 15m	SHORECORD-RATIO-16A/15M	Shorecord Set - 3 core - 2.5mm - 16A - 15m
SHORECORD-EXTENS-10A/25M	Shorecord extension cable - 3 core - 1.5mm - 10A - 25m	SHORECORD-RATIO-16A/25M	Shorecord Set - 3 core - 2.5mm - 16A - 25m
SHORECORD-EXTENS-16A/15M	Shorecord extension cable - 3 core - 2.5mm - 16A - 15m	SHORECORD-RATIO-32A/15M	Shorecord Set - 3 core - 4.0mm - 32A - 15m
SHORECORD-EXTENS-16A/25M	Shorecord extension cable - 3 core - 2.5mm - 16A - 25m	SHORECORD-RATIO-32A/25M	Shorecord Set - 3 core - 4.0mm - 32A - 25m
SHORECORD-MARINCO-10A/15M	Shorecord Set - 3 core - 1.5mm - 10A - 15m	PLG-RATIO-16A-250V	Ratio plug for Ratio shorepower inlet (MP16-110)
SHORECORD-MARINCO-10A/25M	Shorecord Set - 3 core - 1.5mm - 10A - 25m	PLG-RATIO-32A-250V	Ratio plug for Ratio shorepower inlet (MP32-110)

Please contact Energy Solutions for further information and order details. (*Available 2010)

FREQUENCY CONVERTERS

SHORE POWER SOLUTION

The MP16 Shore Power System from Ratio Electric has been designed to hook-up your boat quickly and easily.

Based on the world standard for outdoor connections (the IEC 60309) this system offers a reliable and approved shore power connection. Pre-assembled and moulded the system offers a truly simple yet robust solution for shore power.

The corrosion resistant stainless steel Power Inlet adds the finishing touch to every boat. A stylish, easy locking, waterproof cap.

The marine cord set features a MP16-20 moulded boat connector, which includes an LED power indicator and protection cap, and a moulded CEE shore plug to PUR cable. This combination offer the most watertight, rugged and reliable shore power system on the market.

Technical Specification

Standard	IEC 60309
Waterproof	IP56
Cordset	Moulded connectors, PUR cable
Housing	Solid cast 316 stainless steel
Rating	16A / 250 V - 32A / 250V

16 to 32A adaptor plug

Frequency converters from ASEA power systems allow you to plug your yacht into shorepower anywhere in the world.

The Asea Power frequency converter will accept any input voltage between 180 - 520 volts and any input frequency between 45 - 66 Hz. The unit is completely automatic; simply plug in and Asea Power will do the rest.

The Asea Power range of static frequency converters are designed to supply high quality, continuous duty sinusoidal power of a fixed frequency and voltage for stable on board power.

They are quiet in operation and maintenance free. Not only will they provide voltage and frequency conversion, but as an additional benefit they offer galvanic isolation and a high level of filtering from transients, spikes and voltage variations from the marina supply.

The stainless steel cabinets are powder coated for a long life, fixings are stainless steel and PCB's are resin coated.

Models available:

- **Single phase output from 8 - 105 Kva**
- **Three phase output from 36 - 300 Kva**

Cord Sets

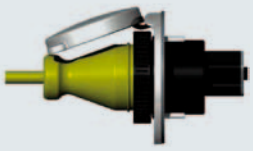
The Ratio Electric Marine Cord sets with moulded connectors to PUR cable offer the best watertight, rugged and reliable construction on the market.

The advantages of the moulded plugs are numerous including:
- Reliable crimp contacts
- Compact and tamper proof construction
- Integrated bend and strain relief

The PUR Cable all offers advantages to boat owners:
- Good resistance to oil and other chemicals
- Extremely robust and noted for its tear and abrasion resistance
- Suitable for lying outdoors and resistant to UV radiation

Marinco Compatible Cord Sets 16A, 250V
This set is compatible with the Marinco inlet. It has a moulded 3 pin CEE plug and mould Marinco compatible plug with LED power indicator, threaded locking ring and weather proof protection cap. CE marked.

CEE Extension Cord Sets 16A 250V
Includes a moulded 3 pin (male) CEE plug and moulded (female) CEE connector with LED power indicator and weather proof protection cap. CE marked.



We also supply a range of accessories for organising your shore power components.

To order: T. +44 (0)1634 290772 E. sales@energy-solutions.co.uk

ROLLS BATTERIES

MARINE WET BATTERIES

Rolls are the battery of choice for serious sailers for over sixty years. Specifically designed for the marine environment they have the highest lead content and largest liquid reserve of any deep cycle battery.

Double isolated positive. The positive plate within the battery is doubly insulated and sealed in a tough polyethylene envelope eliminating the cause of most battery failures.

Dual container. Most of the range is built into an unique dual container system. Individual cells are assembled in a polyethylene outer container giving double protection against breakage and leaks.

Rugged plates. The heavier rezistox plates put more metal where it counts. This results in better corrosion resistance and more active material. The exclusive multi plate construction increases active surface area giving 33% higher discharge rates.

Removable cells. Removable cells mean easier installation of your battery on your boat and simple replacement without special tools or skills.

Unrivalled warranty. 4 year on 300 series, 7 year on 300 series and 10 year on 5000 series.

Huge range. The Rolls marine battery system extends from 90 aH to 2491 aH - all without having to parallel your batteries.

SONNENSCHEIN BATTERIES

2 VOLT GEL BATTERIES

Maintenance free, completely sealed, long life gel traction batteries.

Two volt gel batteries, with their extremely long life span, are ideal for use in demanding marine and mobile applications.

With capacities available up to 3000 Ah, high capacity requirements can be accommodated without resorting to excessive paralleling.

The gelled electrolyte re-absorbs the small amount of gas evolved during charging. This means a safer battery. Because the electrolyte is gelled the battery is spill and leak proof, aiding installation in awkward areas. Being maintenance free, neglect through lack of servicing is a thing of the past.

- **Ideal for cyclic applications**
- **Maintenance & Gas Free**
- **High Recharge Rate Possible**
- **Very Low Self Discharge**
- **Long Service Life**
- **Very Low Self Discharge**
- **No Electrolyte Leakage**

12 VOLT GEL BATTERIES

Dryfit technology was developed by Sonnenschein and to this day, no other comparable product on the world market has been able to match the performance of original dryfit batteries.

- Built for cyclic life.
- Low natural discharge rate.
- Thick plates for long life and deep cycling.
- Deep discharge proof.

Reliable engine starting and on-board power are an essential part of enjoyable and safe boating. Sonnenschein Gel batteries are specifically designed for service battery banks but are equally suitable for use as starter batteries.

Model	V	Ah(C20)	CCA
GF12022YF	12	24	175
GF12033Y1	12	38	300
GF12051Y1	12	56	NA
GF12051Y2	12	56	450
GF12065Y	12	78	600
GF12072Y	12	80	450
GF12094Y	12	110	760
GF12090V	12	98	760
GF12105V	12	120	NA
GF12110V	12	120	920
GF06180V	6	200	NA
GF12160V	12	196	1100

Full product listings, product technical information, general technical information and price lists online at **www.energy-solutions.co.uk**

CruzPro

PMS

CRUZPRO

CRUZPRO INSTRUMENTS

Introducing a new generation of instruments, CruzPro is the intelligent choice, offering peace of mind monitoring at a glance.

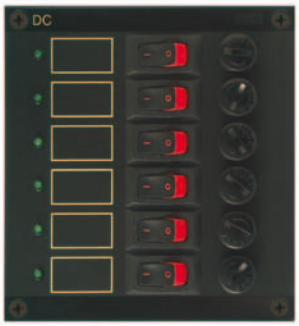
- **Depth and speed instruments**
- **Engine instruments**
- **Digital gauges**
- **Alarms**
- **Monitors**
- **Accessories**
- **NMEA outputs on many models**
- **NMEA - RS232 Converters**

Intelligent Windlass Chain Counter • Gas Detectors • Volt/Amp/Amp-Hour Monitors • Smart Alternator Regulator • Digital Fuel Gauge/Flow Calculator • Multi-Step Solar Charge Controllers • Bilge Water Alarms • AC Volts/Amps/Frequency Display • Digital Pyrometer • DC Dimmers, most available in 12 & 24v.

PMS MODULAR PANEL SYSTEM

With 75 panels in the range the PMS system offers a high quality flexible solution to your control panel requirements. The 4mm thick anodised aluminium panels can be built up to suit your specific requirements. A further advantage is the ease of extending or modifying your control panel by simply adding additional panels.

- **Blank Panels**
- **Battery Isolators**
- **Toggle Switch Panels**
- **Monitoring Panels**
- **LED Indicator Panels**
- **Circuit Breaker Panels**
- **Custom Panels**



SERIES 0 (240 X 260mm)
Blank, custom & mimic available.

SERIES 1 (240 X 130mm)
14 types available

SERIES 3 (120 x 65mm)
22 types available

SERIES 2
(120 x 130mm)
24 types available

SERIES 4 (60 x 65mm)
14 types available

PMS Labels - We can supply label stickers for PMS Panels. Please contact us for your requirements.

To order: T. +44 (0)1634 290772 E. sales@energy-solutions.co.uk

ENERGY SOLUTIONS

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POWER AT YOUR CONTROL